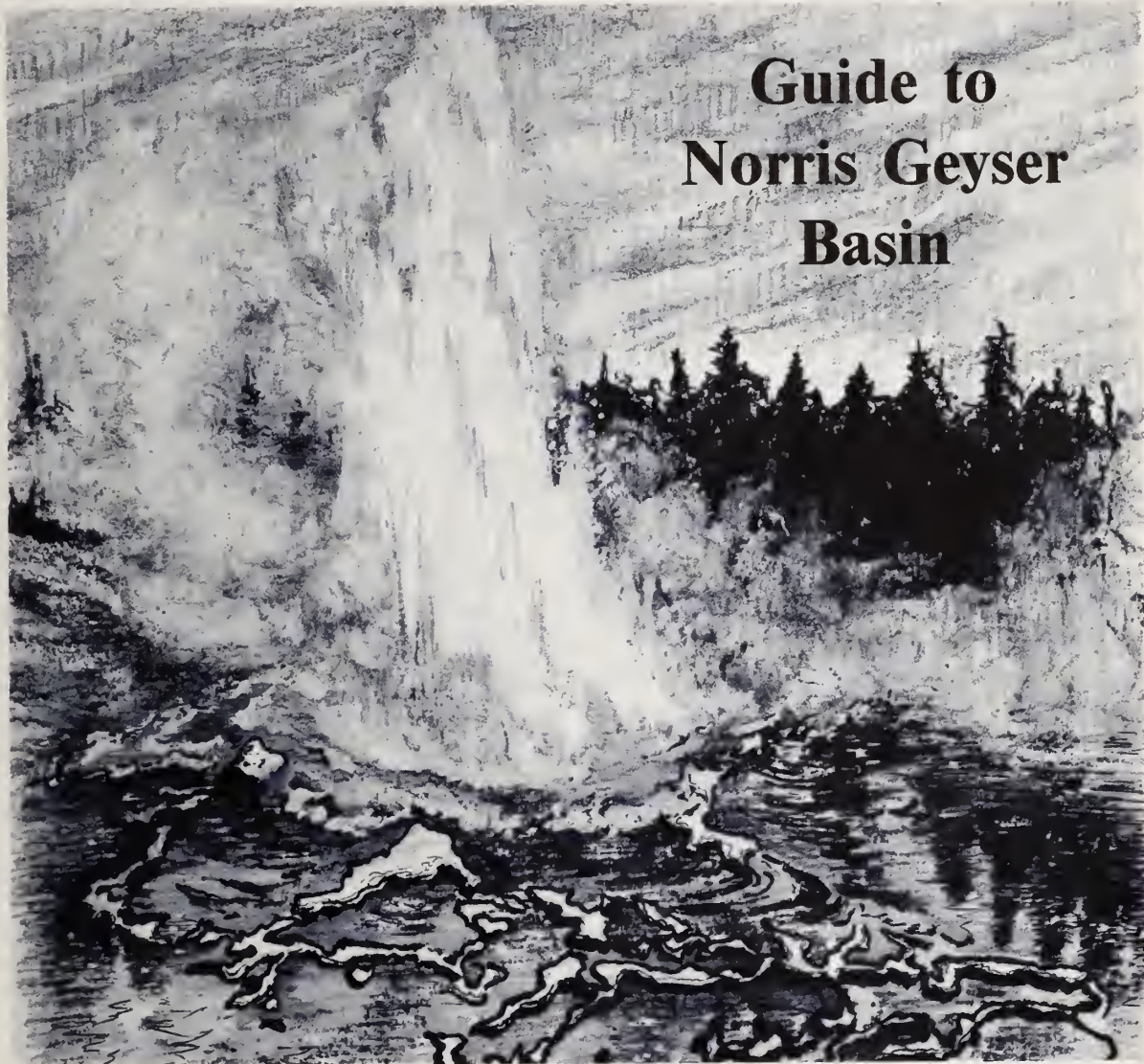


YELLOWSTONE

Guide to Norris Geyser Basin

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You have entered the hottest, most volatile geyser basin on this continent, if not in the world. No-where else can you find the diversity and changeability that occurs at Norris. The highest temperature gradient yet recorded in any geothermal area on this planet, excluding active volcanoes, was measured in a scientific drill hole at Norris: 459°F just 1,087 feet below the surface! Most springs

and all geysers here are hot enough to release boiling water. Norris is the oldest of any of Yellowstone's active geyser basins; hot spring waters have flowed here for over 115,000 years. The world's tallest geyser and colorful thermal basins are but two of the many highlights of this unique area.

PORCELAIN BASIN

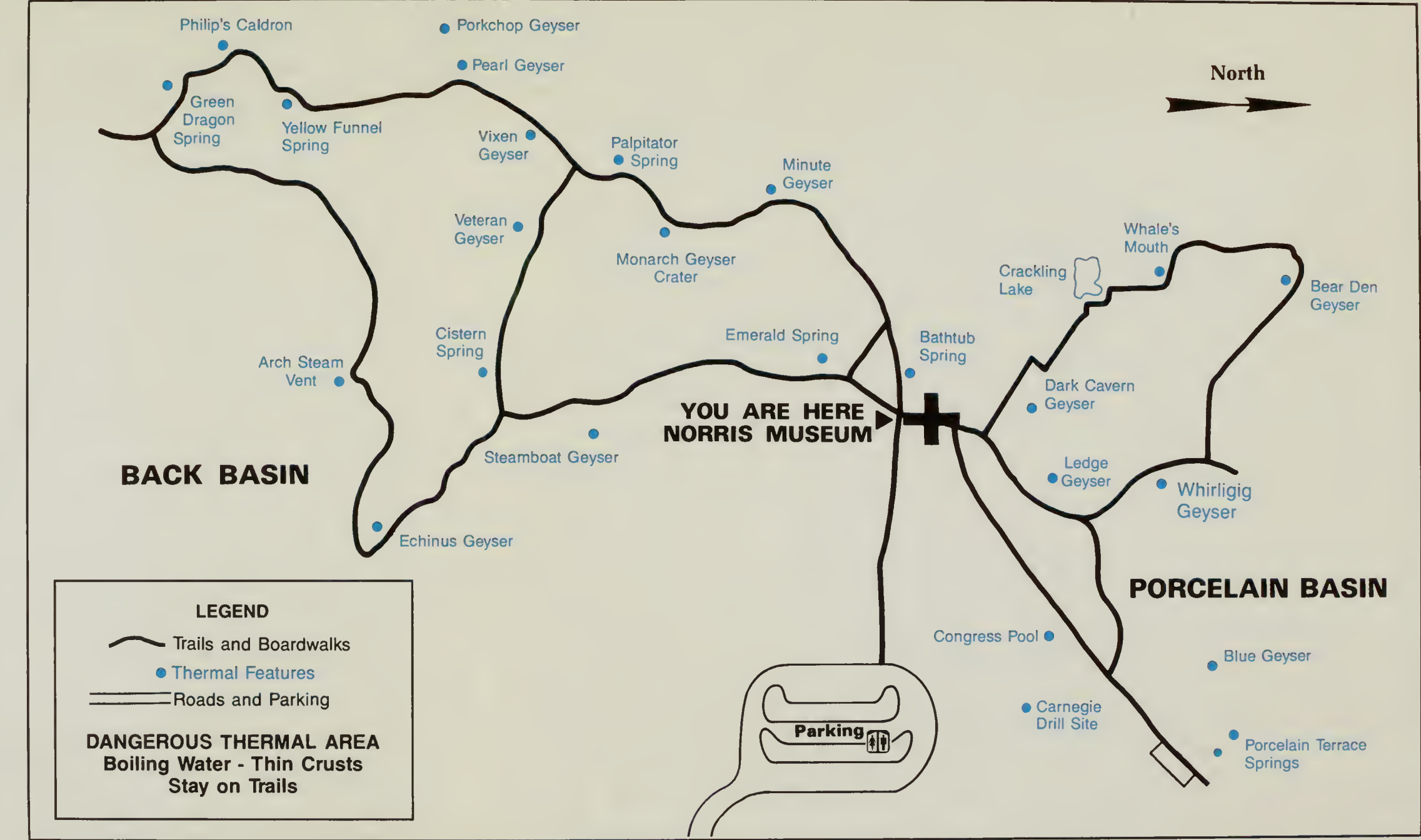
The Porcelain Terrace Overlook: in front of you is a scene like none other on the face of our planet. Close your eyes for a moment; hear the raw, seething expression of the earth's heat beneath us. Parts of the whitish rock sheet before you pulsate from the pressure of steam and boiling water beneath them. A number of geysers and other features here have been born suddenly in small hydrothermal explosions. The milky coloration of many of these pools is due to their saturation with whitish silica-rich minerals. Note closely the location and nature of the varied features in front of you. Today's configuration will almost assuredly be different the next time you visit Yellowstone.

BACK BASIN

EMERALD SPRING. Emerald Spring combines the blue of clear water with the yellow of its sulfur-coated bottom to form a magnificent green. The temperature of this 27 foot deep pool is usually 194°F or 90°C, and its water is nearly as acidic as tomato juice (pH 4.5 or less).

STEAMBOAT GEYSER. The world's tallest active geyser, Steamboat can erupt to over 300 feet showering viewers with its mineral-rich waters. For hours following its rare 3-40 minute major eruptions, Steamboat thunders with powerful releases of steam. As befitting such an awesome event, full eruptions of Steamboat are entirely unpredictable. Recent major eruptions of Steamboat numbered 23 in 1982, 12 in 1983, 5 in 1984, and 1 in 1988. More commonly, Steamboat ejects water in frequent bursts of 10 to 40 feet. Consult the display in the Norris Museum for recent updates of Steamboat's activity.

CISTERN SPRING. Nearby Cistern Spring seems to share a subterranean link with Steamboat Geyser; following a major eruption of Steamboat, Cistern drains. Normally, Cistern is a beautiful blue



pool which continually overflows. It is extraordinarily creative, depositing as much as 3 to 4 inches of new gray rock (siliceous sinter) each year. By comparison, Old Faithful Geyser and other adjacent thermal features may build deposits at the rate of 1/2 to 1 inch or less per century. Cistern's influence expands throughout the lodgepole forest below; this forest has been slowly

flooded since 1965 with silica-rich water. The pioneering lodgepole forest at Norris is in constant flux, retreating here and in other areas of increasing heat while advancing in places of diminished thermal activity.

ECHINUS GEYSER. A perennial crowd-pleaser, Echinus typically erupts regularly every 35-75

minutes. Its pool fills gradually with water; then suddenly, bursts of steam and water explode 40 to 60 feet skyward. Eruptions usually last 6 to 14 minutes. Echinus is the largest acid-water geyser known; its waters are almost as acidic as vinegar (pH 3.3-3.6). Acid geysers are extremely rare; the majority of our planet's total are found here in the Norris Geyser Basin!

WHY HERE AND NOT IN YOUR HOME TOWN?

Yellowstone has experienced some of the world's greatest volcanic explosions. A large explosion crater (caldera) occupies much of central Yellowstone.

Norris is at the junction of 3 major disturbances in the earth's crust. A major fault (rock fracture) runs south from the Mammoth Hot Springs area toward Norris. This fault crosses a line extending eastward from the Hebgen Lake fault toward Norris. Both of these intersect with fractures extending from the ring fracture zone of the great caldera that dominates central Yellowstone. Being at the probable junction of all these fractures, Norris has an abundance of conduits for intense heat to rise quite close to the surface. Here water circulates deeply and becomes highly pressurized and heated in excess of its surface boiling point (possibly more than 600°F or 270°C for the deepest water!)

CONSTANT CHANGE

Each year at Norris a few new springs and geysers flow forth and others become dry. Some thermal features may alter their activity. Hot springs may erupt as geysers, geysers may erupt in new, unpredictable patterns, or cease erupting - temporarily or permanently.

Earthquakes and tremors are a relatively common aspect of the life of this basin. Often changes in thermal activity are related to seismic readjustments in the earth's crust. Geysers and springs may also create changes themselves. In some springs dissolved rock is redeposited along subterranean passageways as very hot water moves toward the surface. Additional deposits accumulate around the surface vents. If deposition persists, a geyser or spring may choke off its flow of water. As a result, nearby springs may have increased flow, or new springs may be created.

PRIMAL COLORS

Overflow channels of geysers and hot springs are often brightly colored with minerals and simple life forms. You can learn more about thermal colors and the organisms that thrive in this extreme environment at the Norris Museum.

DEATH BY MURDER

Geysers are fragile rarities of the natural world. While geysers often die natural deaths at Norris, sometimes healthy geysers are murdered by vandals. Rocks, sticks and other objects thrown into a geyser's vent may be permanently cemented in place and ultimately choke off eruptive activity. Ebony Geyser in Porcelain Basin and Minute Geyser in Back Basin are victims of this thoughtless destruction. For the sake of all those who will follow, never throw objects into geysers or other features.

WARNING

The risk of permanent scarring or death from severe burns is ever present off the boardwalks and trails at Norris. Seemingly stable ground may actually be a paper thin crust concealing boiling water beneath. For your own safety you must remain on designated walkways in thermal areas. Pets are not permitted in the Norris Geyser Basin.



This guide was published by the Yellowstone Association for Natural Science, History Education, Inc. in cooperation with the National Park Service, US Dept. of Interior. The Yellowstone Association is a nonprofit organization dedicated to service to the park its visitors. For more information about its activities, write to P.O. Box 117, Yellowstone National Park, WY 82190